Universal and reusable virus deactivation system for respiratory protection

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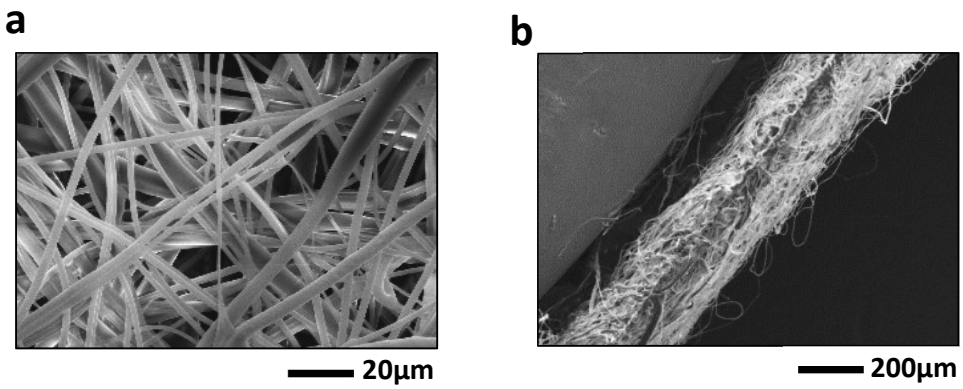
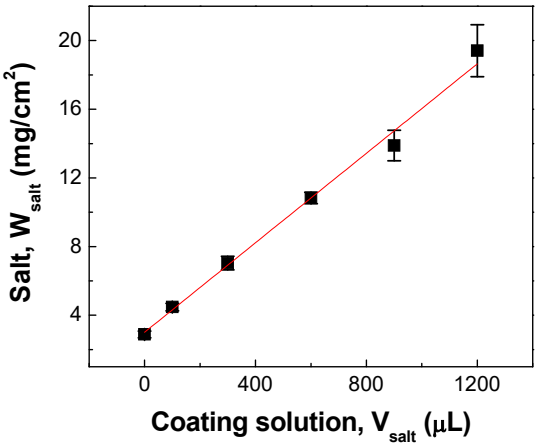
Supplementary figures



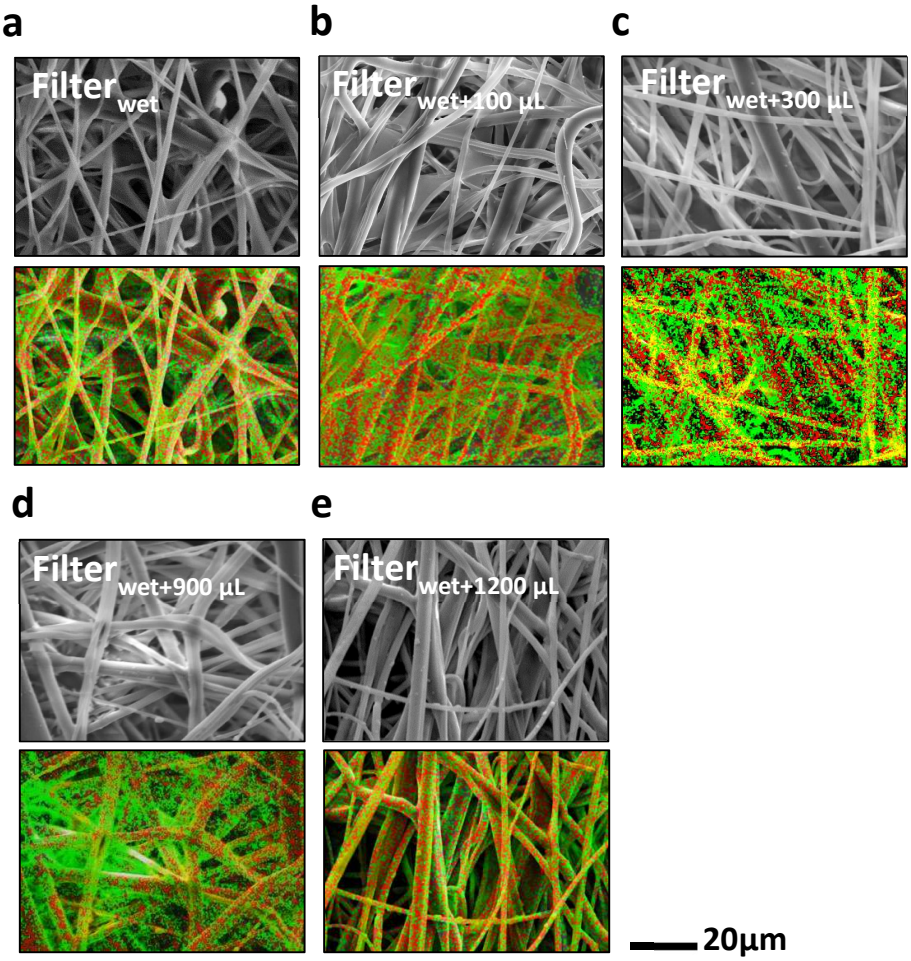
Supplementary Fig. S1

SEM micrographs of PP filter of bare surgical mask ($Filter_{bare}$). (**a**) Top view and (**b**) cross-sectional view.



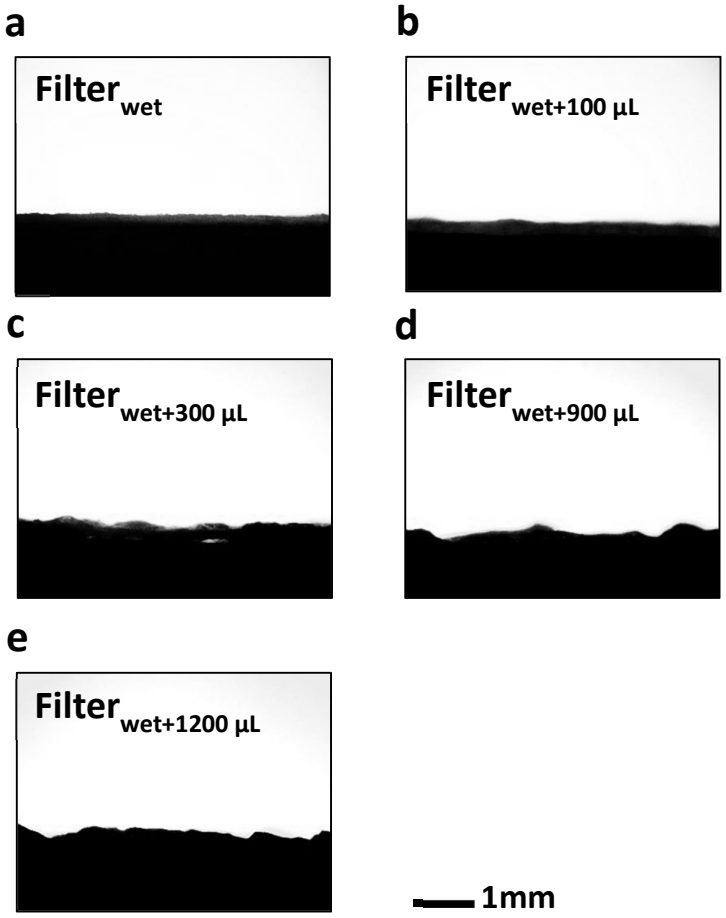
Supplementary Fig. S2

Plot showing the relationship between the volume of coating solution used for drying of pre-wet filters (V_{salt}) and amount of coated salts (W_{salt}) (n = 7, mean ± SD).



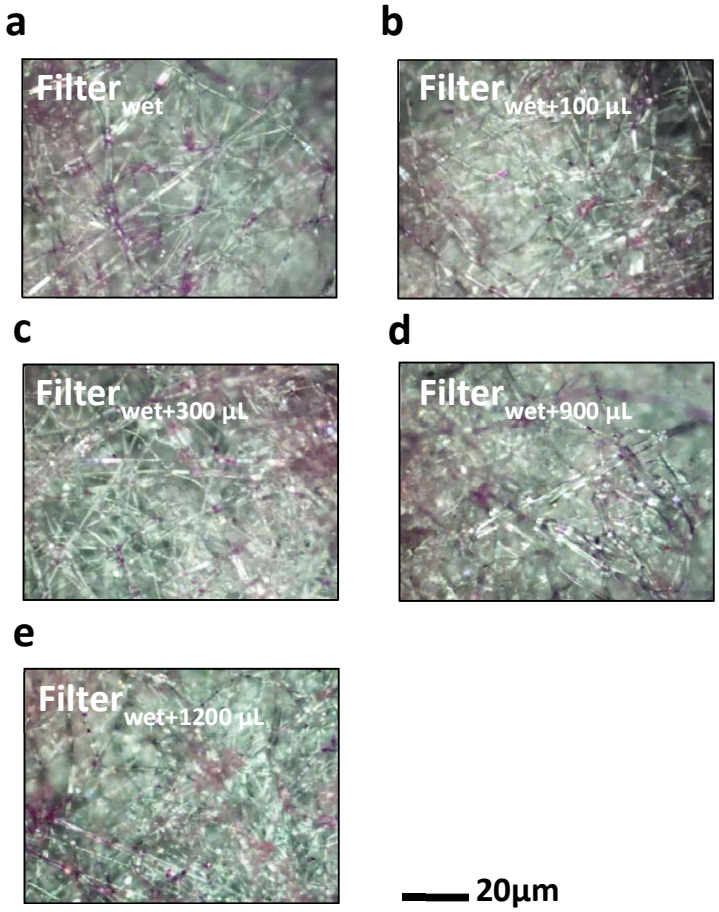
Supplementary Fig. S3

Representative SEM/EDX mapping images of salt-coated filters. (**a**) $Filter_{wet}$, (**b**) $Filter_{wet+100\mu L}$, (**c**) $Filter_{wet+300\mu L}$, (**d**) $Filter_{wet+900\mu L}$, and (**e**) $Filter_{wet+1200\mu L}$ (top: SEM, bottom: EDX mapping).



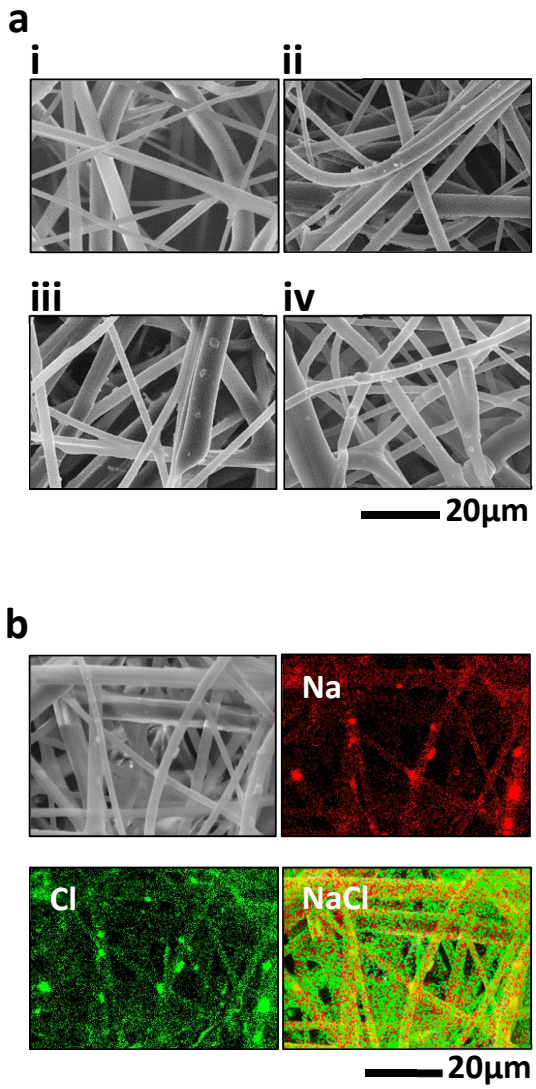
Supplementary Fig. S4

Optical microscope images of cross-sectional view of salt-coated filters after applying a drop of DI water (3 µL) for contact angle measurements. All of salt-coated filters exhibited complete wetting (n = 10).



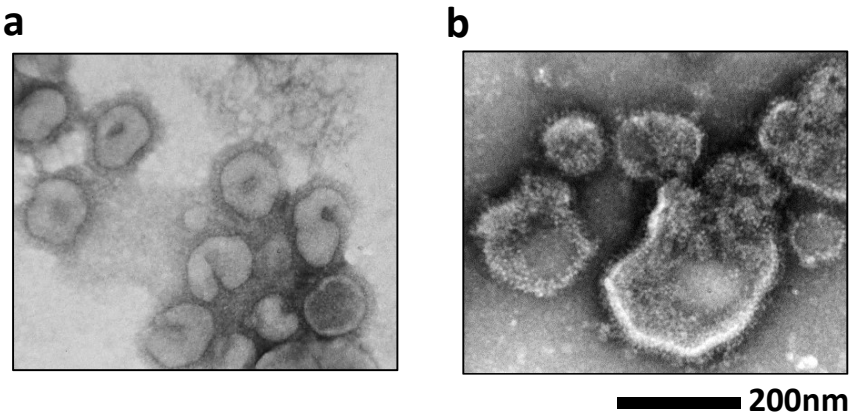
Supplementary Fig. S5

Optical microscope images of top view of salt-coated filters right after exposure to aerosols. All of salt-coated filters exhibited complete wetting (n = 10).



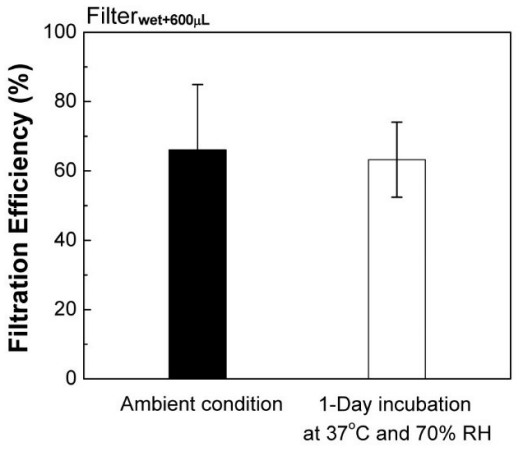
Supplementary Fig. S6

(**a**) SEM images of filters incubated for 60 min after exposure to influenza virus (i: $Filter_{bare}$, ii: $Filter_{wet}$, iii: $Filter_{wet+600\mu L}$, iv: $Filter_{wet+1200\mu L}$) showing the micron-sized NaCl phase on salt-coated filters upon drying of aerosols. (**b**) SEM/EDX mapping images of $Filter_{wet+600\mu L}$ exposed to aerosols (Na: red, Cl: green). Micron-sized structure on the filter is identified as NaCl phase due to NaCl salt recrystallization.



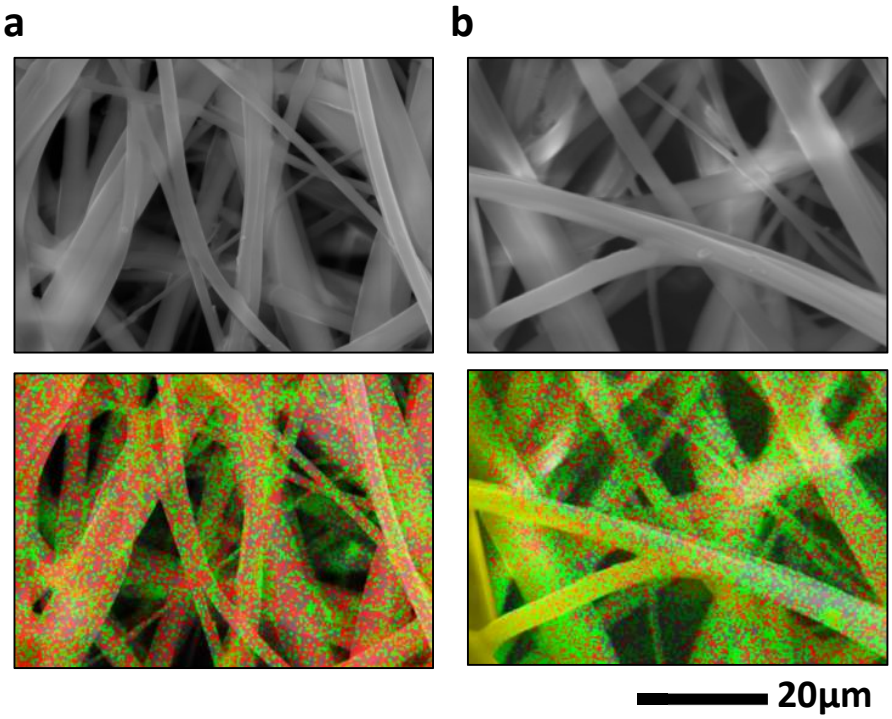
Supplementary Fig. S7

Negative-stain TEM micrographs of A/CA/04/2009 (H1N1) influenza virus incubated for 1 hr in solution obtained from suspension of (**a**) $Filter_{bare}$ and (**b**) $Filter_{wet+600\mu L}$ showing the effects of high salt/surfactant concentration and osmotic pressure on virus morphology.



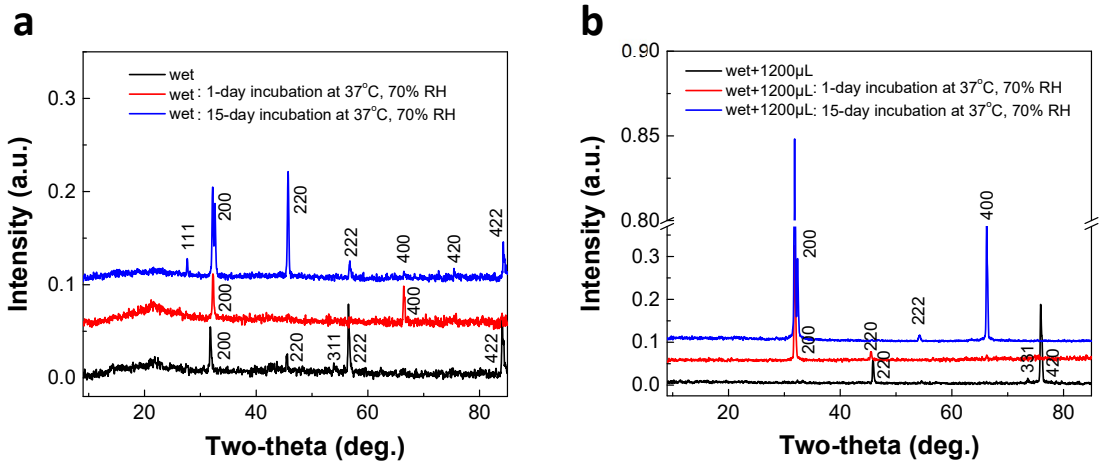
Supplementary Fig. S8

Filtration efficiency of $Filter_{wet+600\mu L}$ before and after 1 day incubation at 37°C and 70% RH (n = 12, mean ± SD).



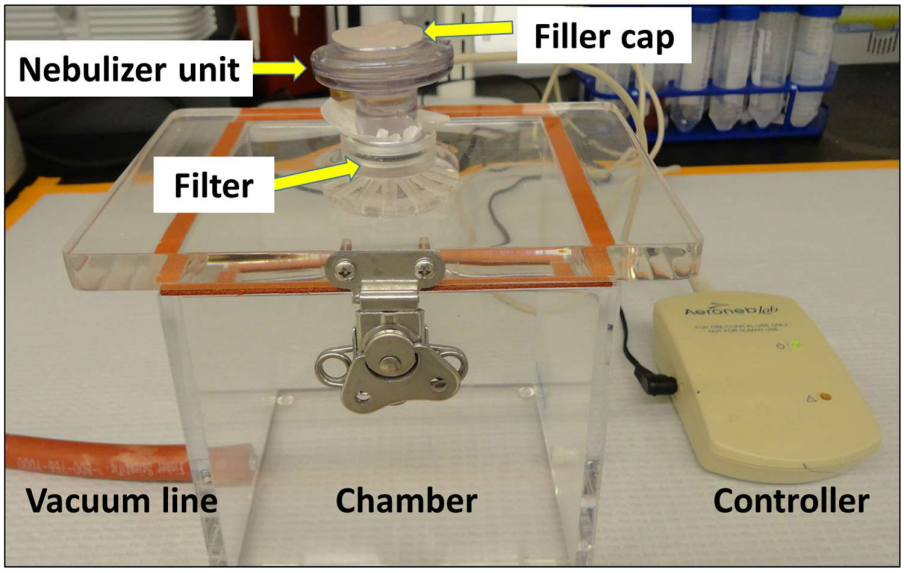
Supplementary Fig. S9

SEM (top)/EDX mapping (bottom) images of (**a**) $Filter_{wet}$ and (**b**) $Filter_{wet+1200\mu L}$ after incubation for 15 days at 37°C and 70% RH.



Supplementary Fig. S10

XRD spectra of (**a**) $Filter_{wet}$ and (**b**) $Filter_{wet+1200\mu L}$ before and after incubation at 37°C and 70% for 1 day and 15 days.



Supplementary Fig. S11
Experimental setup used to measure filter performance.